

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:

Attorney Docket No.: 2733.35WOUS

Leung Choi Chow et al.

Confirmation No.: 4192

Application No.: 10/552,097

Examiner: Joshua J. Michener

Filed: February 21, 2006

Group Art Unit: 3644

For: LANDING GEAR ASSEMBLY

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APPEAL BRIEF UNDER 37 CFR § 41.37

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Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

The Appeal Brief is presented in support of the Notice of Appeal to the Board of Patent Appeals and Interferences, filed on December 23, 2010, from the Final Rejection of claims 15-18, 20, 23, 27-29, 33-35 of the above-identified application, as set forth in the Final Office Action mailed on August 23, 2010.

Electronic payment is submitted by credit card for the requisite fee set forth in 37 CFR § 41.20(b)(2). The Commissioner of Patents and Trademarks is hereby authorized to charge any additional fees due to Deposit Account No. 16-0631. The Appellants respectfully request consideration and reversal of the Examiner's rejections of pending claims.

1. REAL PARTY IN INTEREST

The real party in interest of the above-captioned patent application is the assignee, Airbus UK Limited.

2. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to Appellant that will have a bearing on the Board's decision in the present appeal.

3. STATUS OF CLAIMS

Claims 15-29 and 30-35 are pending. Claims 1-14 and 30 have been cancelled. Claims 15-18, 20, 23, 27-29, and 33-35 stands rejected having been at least twice rejected. Claims 19, 21-22, 24 and 31-32 stands withdrawn from consideration.

4. STATUS OF AMENDMENTS

No amendments have been made subsequent to the Final Office Action dated August 23, 2010.

5. SUMMARY OF CLAIMED SUBJECT MATTER

In this summary, the page and line numbers cited are based on the substitute specification filed on October 4, 2005, identified in PAIR as one of the “Documents submitted with 371 Applications.”

Independent claim 15 is directed to an aircraft comprising a landing gear moveable between a stowed position and a deployed position. The landing gear includes a wheel/tire assembly. (Fig. 2, reference numerals 1, 9) The wheel/tire assembly includes a wheel having a rim around which there is mounted a tire. (Figs. 1a, 3a, 4, reference numerals 1, 3, 4, 5, Page 10, Lines 13-23) The tire and the rim are each so shaped that a gap is defined between a surface of the rim and a surface of the tire, (Figs. 1a, 1b, reference numerals 6, Page 2, Lines 12-15, Page 10, Line 23- Page 11, Line1) A separate part is provided at the junction between the tire and the rim (Fig. 1b, reference numeral 7, Page 4, Lines 3-15, Page 10, line 8) The separate part has a first surface that abuts the tire, (Fig. 1b, reference numeral 7a, Page 11, Lines 4-5) a second surface in contact with the rim, (Fig. 1b, reference numeral 7b, Page 11, Lines 5-6) and a third surface which extends between the first surface and the second surface. (Fig. 1b, reference numeral 7c, Page 11, Lines 6-8) The separate part provides a surface to smooth and close the gap in the region of the junction between the tire and the wheel rim. (Fig. 1b, reference numeral 7c, Page 11, Lines 6-8) On at least one side of the wheel, during use of the landing gear on an aircraft when airborne and the landing gear is in a position ready for landing of the aircraft, the third surface of said separate part acts to reduce the noise that would result in the absence of the separate part from the interaction of the gap and the airflow during approach of the aircraft on landing (Figs. 1b, 2a, Page 11, Lines 13-19) On at least one side of the wheel during use of the

aircraft when airborne and the landing gear is in a position ready for landing of the aircraft, the surface of the wheel/tire assembly presented to the airflow across the part bounded by the widest part of the tire is substantially flat. (Figs. 1a, 3a, 4, 5a and 5c, reference numeral 2a, Page 11, Lines 9-12, Page 14, Lines 10-18)

According to claim 16, which depends from claim 15, at least a portion of the separate part is flexible and so arranged that it may be moved manually to reveal a portion of the tire that is otherwise hidden from view. (Page 6, Lines 7-20)

According to claim 17 which depends from claim 15, the separate part is defined at least partly by an elastically deformable material. (Page 6, Lines 3-6)

According to claim 18 which depends from claim 15, the separate part is defined by a multiplicity of flexible elements each extending radially across the junction between the tire and the rim. (Page 4, Lines 17-19, Fig. 5, reference numeral 20)

According to claim 20 which depends from claim 15, at least a portion of the separate part is so configured that, once the force between the wheels and the ground exceeds a first given threshold force, it moves out of a gap that the separate part bridges when the aircraft is airborne. Once the force between the wheels and the ground drops to or below a second given threshold force, it moves back to the position in which it bridges the gap. (Page 5, Lines 8-23, Page 6, Lines 1-2).

According to claim 23 which depends from claim 15, the separate part is disposed on both sides of the wheel such that, during use of the landing gear on an aircraft when airborne and the landing gear is in a position ready for landing of the aircraft, the surface of each separate part interfaces smoothly with a surface, presented to the airflow, of the tire and a surface, presented to the airflow, of the wheel. (Page 7, Line 21- Page 8, Line 4; Page 9, Lines 1-7; Fig. 1a)

According to claim 27 which depends from claim 15, the aircraft is of a size suitable for carrying more than 50 passengers. (Page 8, Lines 11-13).

Independent claim 28 is directed to a retractable aircraft landing gear including a wheel/tire assembly. (Fig. 2, reference numerals 1, 9) The wheel/tire assembly includes a wheel having a rim around which there is mounted a tire. (Figs. 1a, 3a, 4, reference numerals 1, 3, 4, 5, Page 10, Lines 13-23) The wheel further includes at least one part that smoothly envelopes the junction between the tire and the rim. (Figs. 1a, 3a, reference numerals 13, 13a, 13b, Page 12, Lines 9-15) The at least one part is shaped such that on at least one side of the wheel, (Figs. 1a, 3a) during use of the landing gear on an aircraft when airborne and the landing gear is in a position ready for landing of the aircraft, a surface exposed to the airflow of said at least one part interfaces smoothly between a surface, exposed to the airflow, of the tire and a surface, exposed to the airflow, of the wheel so that in use the flow of air past said at least one part is streamlined. (Figs. 1a, 3a, Page 12, Lines 15-18) On at least one side of the wheel when the landing gear is in a position ready for landing of the aircraft, the surface of the wheel/tire assembly presented to the airflow across the part bounded by the widest part of the tire is substantially flat. (Figs. 1a, 3a, Page 12, Lines 12-18, Page 14, Lines 10-18).



According to claim 29 which depends claim 15, the invention also includes a method of reducing noise caused by an aircraft during approach of the aircraft on landing including a step of modifying an existing design of an aircraft in order to reduce noise caused by the landing gear of the aircraft, and a step of manufacturing an aircraft according to claim 15.

According to claim 33 which depends from claim 15, the first surface follows the shape of the tire. (Page 11, Lines 1-8, Fig. 1b, reference numeral 7a).

According to claim 34 which depends from claim 15, the second surface follows the shape of rim. (Page 11, Lines 5-6, reference numeral 7b).

According to claim 35 which depends from claim 15, the surface of the wheel/tire assembly presented to the airflow, within the part bounded by the widest part of the tire is substantially planar. (Page 12, Lines 12-18, Figs. 3a, 3b).

This summary does not provide an exhaustive or exclusive view of the present subject matter, and Appellant refers to the appended claims and its legal equivalents for a complete statement of the invention.

6. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 15-18, 20, 23, 27-29 and 33-35 are unpatentable under 35 U.S.C. § 103 over Hartel (US 3,133,717) in view of Roth (US 1,743,074) and whether claims 15-18, 20, 23, 27-29 and 33-35 are unpatentable under 35 U.S.C. § 103 over Labrecque (US 3,430,896) in view of Roth (US 1,743,074).

7. ARGUMENT

A. The Applicable Law under 35 U.S.C. § 103

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. 35 U.S.C. § 103(a).

To establish a prima facie case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *Schenck v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983) MPEP 2141.01(a). Emphasis in original.

A prior art reference must be considered in its entirety, i.e. as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed Cir 1983), *cert. denied*, 469 U.S. 851 (1984).

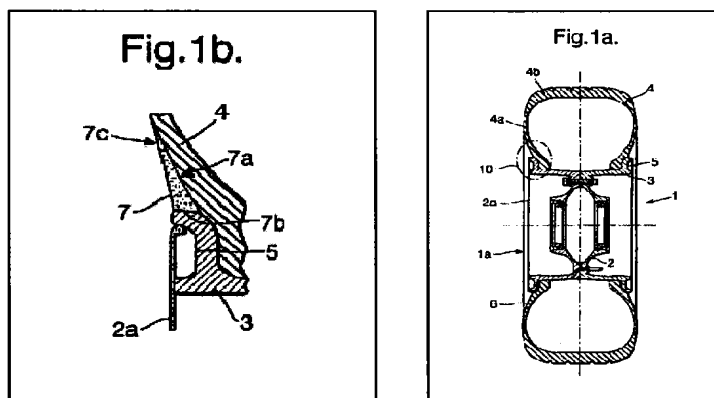
“All words in the claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

B. Discussion of the rejection of claims 1-23 under 35 U.S.C. § 103 as being obvious.

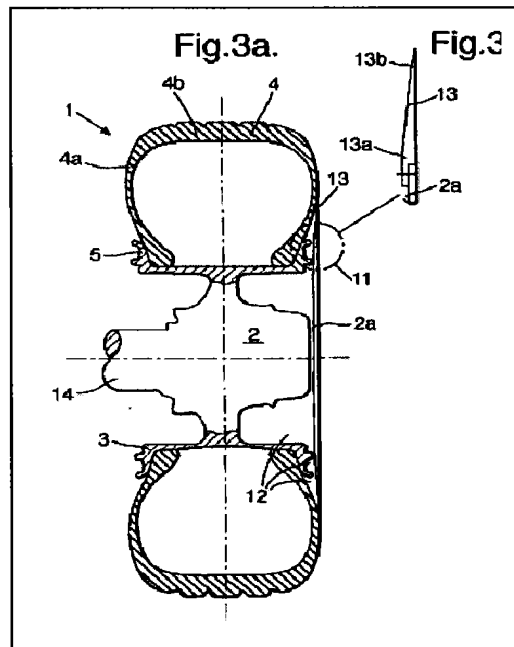
i. Background

The invention relates to the control of noise generated by the interaction of an aircraft and air flowing relative to the aircraft. In particular, the invention relates to noise created by turbulence at the retractable landing gear assembly when extended. More specifically the invention related to minimizing noise created by the interaction of the air flow with the wheel and tire assembly of the landing gear. The invention relates to landing gear that is retractable in flight and lowered for take-off and landing.

The invention is particularly helpful in reducing noise that is generated at the wheel and tire during the final approach to landing. This setting is important because the aircraft engines are at low power or at idle and relatively quiet. Generally, the rest of the aircraft is aerodynamically clean and generates little turbulence and noise to disturb people on the ground under the landing flight path. The wheel and tire assemblies are then a significant source of noise that can be irritating to those under the final leg of the landing approach.



In one example embodiment depicted above, the invention includes a separate part at the junction between the tire and rim of the landing gear wheel. The separate part has a first surface that abuts the tire, a second surface that is in contact with the rim of the tire and a third surface that extends between the first surface. The third surface is exposed to the airflow to provide a surface to smooth and close the gap that exists in the region of the junction between the tire and wheel rim. The separate part substantially reduces both turbulence and noise generated that would otherwise exist at this location. This embodiment of the invention further includes, on at least one side of the wheel, a substantially flat structure that extends in a circular fashion entirely across the space between the widest parts of the tire. This structure smoothes airflow over the wheel and tire assembly, thereby reducing turbulence and noise.



In another example embodiment depicted above, the invention includes at least one part that smoothly envelops the junction between the tire and the rim and is structured so that, on at least one side of the wheel, when the landing gear is in position ready for landing of the aircraft, the surfaces of the wheel tire assembly presented to the air flow across the part bounded by the widest part of the tire is substantially flat. In accordance with the invention, this structure smoothes airflow over the wheel and the central part of the tire reducing associated turbulence and noise.

Appellant respectfully submits that the Final Office Action does not establish a prima facie case of obviousness at least because the combination of Hartel and Roth does not disclose or suggest all of the limitations of independent claims 15 or 28 and at least because the combination of Labrecque and Roth also does not disclose or suggest all of the limitations of independent claims 15 or 28. Because the Examiner admits that certain limitation of the claims are not present in Hartel and Labrecque and relies on the Roth reference to support the rejection based on these limitations the only real issue presented is whether Roth discloses the limitations in question.

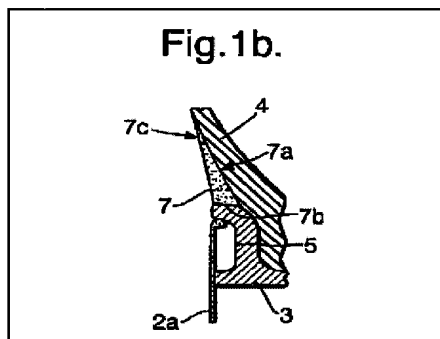
Thus, because the combinations presented in the Final Office Action do not disclose or suggest each and every element of independent claims 15 and 28, Appellant respectfully requests reversal of the § 103 rejections.

ii. The Cited Prior Art Does Not, Either Individually or In Combination, Disclose or Suggest All of The Limitation of Independent Claim 15

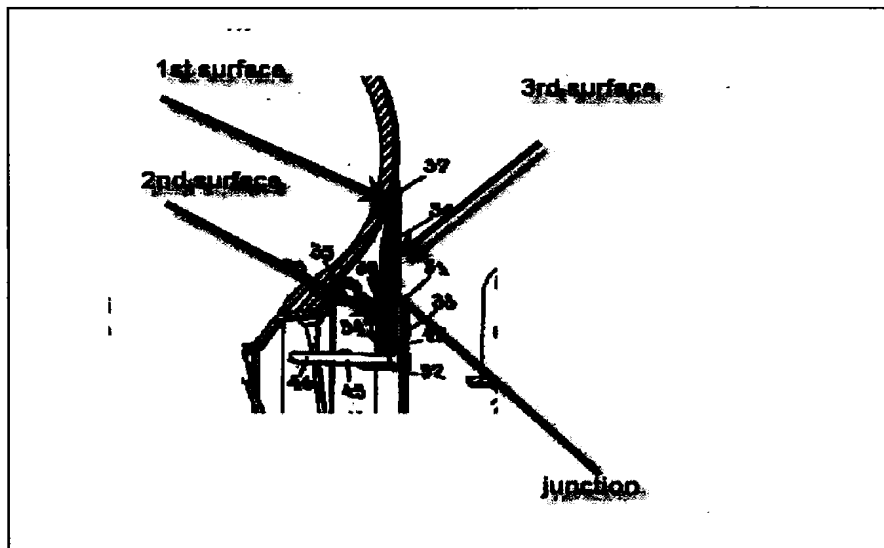
Claim 15

The Final Office Action asserts that all of the limitations of independent claim 15 are taught by the combination of Hartel (U.S. Patent 3,133,717) in view of Roth (U.S. Patent 1,743,074). The Office Action admits that Hartel “fails to teach of a separate part that is provided between the junction to close the gap wherein a first surface abuts the tire, a second surface in contact with the rim and a third surface that extends across the junction.” The Examiner asserts that these limitations are taught by Roth. Applicant respectfully traverses this assertion and the rejection.

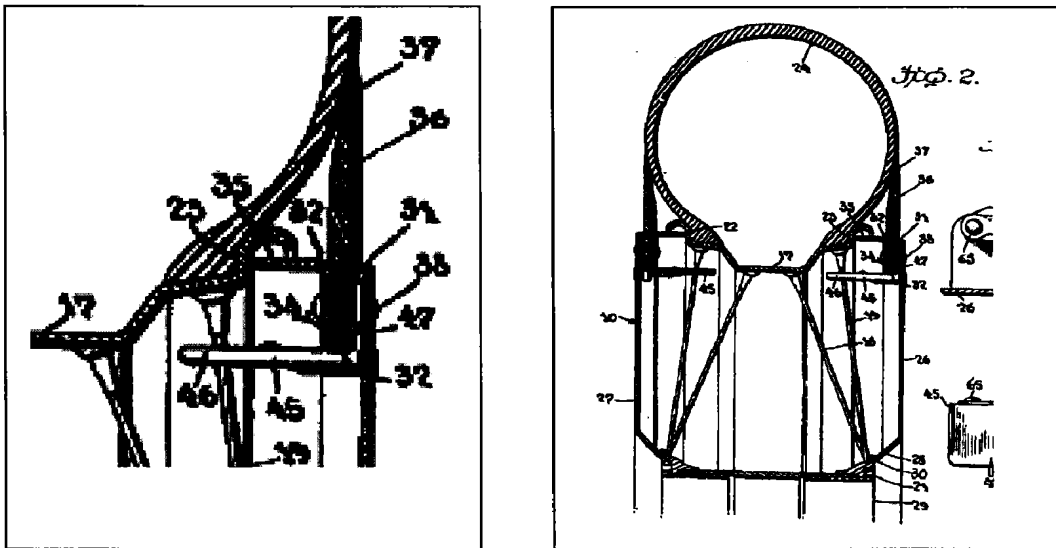
Roth does not disclose or suggest a separate part having a first surface that abuts the tire, a second surface in contact with the rim, and a third surface which extends between the first surface and the second surface, as recited in claim 15. The claim structures are depicted, for example, in Fig. 1b of the present application.



In Fig 1b, the tire is identified by reference numeral 4 and the rim is identified by reference numeral 3. The separate part is identified by reference numeral 7; the first surface that abuts the tire is identified by reference numeral 7a; the second surface, in contact with the rim is identified by reference numeral 7b and the third surface which extends between the first surface and the second surface is identified by reference numeral 7c. The Examiner asserts, in the Final Office Action, that these structures are found in Fig. 2 of Roth and presents the annotated image reproduced below with little explanation but a listing of reference numerals (17, 23, 35, 32, 34) showing where the Examiner identifies the structures.





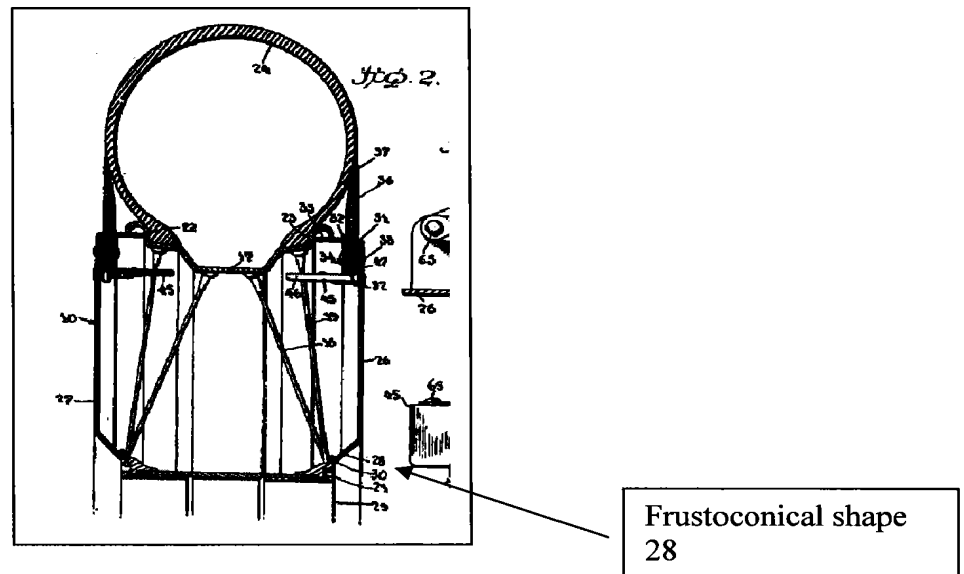


Upon careful review of Figure 2 (above right) and a detail of Fig. 2 (above left), the structures in Roth identified by the Examiner as constituting the second surface in contact with the rim, do not contact the rim at any point. Instead, the structures contacted by the second part are, according to Roth, parts of annular flange 31, which is a part of metallic disc 26 and parts of fastening device 45, which according to Roth, is also part of metallic disc 26 and secures metallic disc 26 to the wheel. These structures are part of the “windshield” as disclosed by Roth and not part of the wheel rim 17. Accordingly, annular rubber lip 36 of Roth does not contact rim 17 at rim flange 23 or indeed any part of the wheel as disclosed by Roth. Accordingly, the identified structure does not meet the limitations of “a second surface in contact with the rim” as recited in claim 15. Thus, at least this limitation of claim 15 is not disclosed or suggested by Roth and claim 15 should be patentable for at least this reason.

Further, claim 15 recites that the separate part has a first surface that abuts the tire, a second surface in contact with the rim and a third surface which extends between the first surface and the second surface. Accordingly, in cross section, as can be seen above in Figure 1b of the present application, the separate part is substantially triangular in shape. The third surface is identified by reference numeral 7c. Annular rubber lip 36 of Roth, identified by the Examiner as the separate part, does not include a third surface extending between the first surface and the second surface. Roth discloses a structure that is quadrilateral in cross section and the surface identified by the Examiner as the third surface does not extend between the first surface and the second surface as claimed. The identified third surface does not contact the part identified by the Examiner as the second surface. Thus, the structure cannot extend between the first surface and the second surface as recited in claim 15. Accordingly, this additional limitation is also not disclosed or suggested by Roth and claim 15 should be patentable for at least this additional reason.

Claim 15 further recites “on at least one side of the wheel when the landing gear is in position ready for landing of the aircraft, the surface of the wheel/tire assembly presented to the airflow across the part bounded by the widest part of the tire is *substantially flat*.” Emphasis added.

The Final Office Action admits that these limitations are not taught by Hartel but asserts that these limitations are disclosed by Fig. 2 of Roth. The entirety of Fig. 2 is not depicted in the Final Office Action but is reproduced below.



Instead of a substantially flat surface, Roth recites, that metallic disc 26 includes “a central portion of frusto-conical shape, as indicated at 28, with a central opening 29 formed therein.” Roth Page 1, Lines 97-99. Roth continues “[t]he latter opening is defined by the circular edge 30, and is of a diameter sufficiently large to receive an end of the hub.” Roth Page 1, Line 99 – Page 2, Line 2. The “central portion of frusto-conical shape” and “the central opening” can be seen near the bottom of Fig. 2 of Roth, reproduced in its entirety above.

The metallic disc structure disclosed by Roth is not substantially flat but is instead interrupted by a central frusto-conical shaped indentation indicated by reference numeral 28 and has a central opening 29 formed therein. Accordingly, this limitation is also not disclosed or suggested by Roth and claim 15 should be patentable for at least this additional reason.

Further, one of ordinary skill in the aerodynamic arts would know that the frusto-conical shape and central opening as taught by Roth would create turbulence and associated noise when passing through the air at the landing speed of a modern airliner and would thus defeat the purpose of the invention claimed in independent claim 15. Accordingly, to this extent Roth teaches away from the invention.

iii. Claim 15 has been Improperly Rejected Because the Examiner has Improperly Ignored Explicit Limitations of The Claims

“All words in the claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Without identifying any particular “functional language” addressed, the Final Office Action states “It should be appreciated that the applicant’s functional language in the claims does not serve to impart patentability. While features of an apparatus may be recited either structurally or functional, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function.”

First, Appellant notes that all of the above discussed limitations of claim 15 which are not disclosed or suggested by Roth are structural limitations.

Second, The Final Office Action dismisses a number of explicit limitations in the claims while not specifically identifying the limitations being dismissed. The Examiner does so stating “it should be appreciated that the Applicants functional language in the claims does not serve to impart patentability.” This is improper under law because all words in the claim must be considered in judging the patentability of that claim against the prior art. Further, the Examiner apparently dismisses the above-discussed structural limitations by declaring them “functional

language”. Accordingly, even if the Examiner’s interpretation of the law was correct, these limitations should not be dismissed as “functional language”. Accordingly, claim 15 should be patentable for at least this additional reason.

iv. The Combination of Labrecque and Roth also does not Disclose or Suggest All of the Limitations of Independent Claim 15

The Final Office Action admits that Labrecque “fails to teach of a separate part including a first surface that abuts the tire, a second surface in contact with the rim and a third surface that extends between the first surface and the second surface.

The Final Office Action asserts that these limitations are disclosed by Roth. As has been discussed above in significant detail, Roth does not disclose a second part in contact with the rim as recited in claim 15. Because these limitations are not disclosed or suggested by Roth the combination of Labrecque and Roth does not disclose or suggest all the limitations of claim 15. Accordingly, claim 15 should be patentable over the combination of Labrecque and Roth for at least this reason.

The Final Office Action also admits that the limitations “on at least one side of the wheel when the landing gear is in position ready for landing of the aircraft, the surface of the wheel/tire assembly presented to the airflow across the part bounded by the widest part of the tire is *substantially flat*” are not taught by Labrecque. However, the Final Office states, again, that Roth teaches these limitations. As has been discussed above, Roth does not disclose or suggest these limitations because of the presence of the indented frusto-conical part and the opening in the center of the metallic disc disclosed by Roth. Accordingly, since these limitations are not

disclosed or suggested by the combination of Labrecque and Roth, claim 15 should be patentable for at least this additional reason.

Claims 16-27, 29, 31 and 33-35 depend from claim 15 and should be patentable for at least the same reasons as claim 15.

v. The Cited Prior Art Does Not Individually or In Combination Disclose or Suggest All of the Limitations of Independent Claim 28

Claim 28

Independent claim 28 recites the limitations “on at least one side of the wheel, when the landing gear is in a position ready for landing of the aircraft, the surface of the wheel/tire assembly presented to the airflow across the part bounded by the widest part of the tire is substantially flat.”

The Final Office Action rejects claim 28, first, as being obvious over the combination Hartel in view of Roth and, second, as being obvious in view of the combination of Labrecque in view of Roth. In each case, the Final Office Action admits that these limitations are not disclosed or suggested by either Hartel or Labrecque as the primary reference but asserts that these limitations are taught by Roth.

As discussed above with relation to claim 15, instead of a substantially flat surface as recited in claim 28, Roth recites, that metallic disc 26 includes “a central portion of frusto-conical shape, as indicated at 28, with a central opening 29 formed therein.” Roth Page 1, Lines 97-99. Roth continues “[t]he latter opening is defined by the circular edge 30, and is of a diameter sufficiently large to receive and end of the hub.” Roth Page 1, Line 99 – Page 2, Line 2.

The “central portion of frusto-conical shape” and “the central opening” can be seen near the bottom of Fig. 2 of Roth, reproduced in its entirety above.

Accordingly, the metallic disc structure disclosed by Roth is not substantially flat but is instead an annular disc interrupted by a central, frustoconical shaped indentation indicated by reference numeral 28 and a central opening 29 formed therein. Accordingly, this limitation is also not disclosed or suggested by Roth and claim 28 should be patentable for at least this additional reason.

Further, one of ordinary skill in the aerodynamic arts would know that the frusto-conical shape and central opening as taught by Roth would create turbulence and associated noise when passing through the air at the landing speed of a modern airliner and would thus defeat the purpose of the invention claimed in independent claim 28. Accordingly, to this extent Roth teaches away from the invention.

vi. The Office Action misinterprets the claims language “Wheel/Tire Assembly”

The Patent and Trademark Office (‘PTO’) determines the scope of claims in patent applications not solely on the basis of the claim language, but upon giving claims their broadest reasonable construction ‘in light of the specification as it would be interpreted by one of ordinary skill in the art.’ *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364, 70 USPQ2d 1827 (Fed. Cir. 2004)

The Office Action bases the rejection, in part, on the interpretation of the claim term “wheel/tire assembly” as referring to a wheel plus a tire assembly thus interpreting the meaning of the tire alone as meeting the limitation of an assembly. The Examiner asserts in the Final Office Action “[a]s the “wheel/tire” clause is written as an alternative because the “forward slash” in English text can be treated as an “OR” clause, wherein the tire assembly at the widest part would be the widest part of the tire where the separate part interfaces thus meeting the scope

of the claim.” The Examiner makes no citation in support this interpretation of the claim language.

Aside from the lack of clarity of this explanation and the unsupported nature of the assertion, reading of the limitation in this way conflicts with both the understanding of one of ordinary skill in the art and the plain language of the independent claims and thus goes well beyond the broadest reasonable interpretation of the claim language.

The term “wheel/tire assembly” refers to an assembly having both a wheel and a tire. It does not mean a wheel and a separate “tire assembly.” One of ordinary skill in the art is well aware that a tire is a unitary structure that is complete in itself. It is well known to even to a layman that an *assembly* must be *assembled* from several parts. Accordingly, an assembly must be capable of being disassembled and reassembled. A tire is a unitary object that cannot be disassembled and reassembled. To “disassemble” a tire is to destroy the tire. Therefore, a tire alone cannot reasonably be interpreted to be an assembly.

Further, each of independent claims 15 and 28 explicitly defines the “wheel/tire assembly” within the body of the claim as “including a wheel having a rim around which there is mounted a tire.” Thus, there is no doubt that the “wheel/tire assembly” as recited in the claims includes a wheel and tire assembled together. Accordingly, one of ordinary skill in the art would not interpret the claim term “wheel/tire assembly” as the Office Action has suggested but would instead understand that the “wheel/tire assembly” is the assembly made up of the wheel with the tire mounted to it as a wheel and tire are normally assembled when in use.



Further still, if the Examiner's interpretation of the claim language is followed the claim would not read on any of the example embodiments described in the application and would not address the problem or noise generated at the wheel tire interface.

Accordingly, this interpretation is improper and should be withdrawn. Appellants respectfully request that the rejection based on this interpretation be withdrawn.

vii. When "Wheel/tire Assembly" is properly interpreted, Roth does not disclose or suggest "a surface of the wheel/tire assembly presented to the airflow-across the part bounded by the widest part of the tire is substantially flat."

Based on above interpretation, it is clear that these limitations of claim 15 describe the widest part of the complete wheel/tire assembly and not just the widest part of either the wheel or the tire. In Roth, this widest part is the widest point of the tire (located slightly above reference numeral 37 in Figure 2) since the wheel, exclusive of the "windshield," is narrower than the tire. Hence, "the surface of the wheel/tire assembly presented to the airflow-across the part bounded by the widest part of the tire" is bounded by a circle surrounded by this widest point around the wheel/tire assembly and hence, the part that must be "substantially flat" in shape to meet the claim language is bounded by the circle with the circumference corresponding approximately to that point at which reference numeral 37 is located around the tire. In the device disclosed by Roth this includes the rubber lip 36, disc 26, frusto-conical shape of disc 28 and central opening 29.

This surface (from 37 to the centre of 29 and then to point 37 on the other side) is not flat at least because it has significant indented “step” portions at 28 and the central opening 29 (see Roth Figure 2 and page 1, line 92 to page 2, line 7). Figure 2 shows part of this area for the top half of the tire and clearly shows that there is a section where the surface presented to the airflow is not substantially flat in shape (the section of the frusto-conical shape 28 and central opening 29).

Thus, when the claim language is properly interpreted the Roth reference does not disclose or suggest the limitations “on at least one side of the wheel during use of the aircraft when airborne and the landing gear is in a position ready for landing of the aircraft, the surface of the wheel/tire assembly presented to the airflow-across the part bounded by the widest part of the tire is substantially flat” as recited in independent claim 15. Accordingly, claim 15 should be patentable because all of the limitations of claims 15 and 28 are not disclosed or suggested by the cited prior art and the Office Action does not establish a prima facie case of obviousness. Claims 16-27 and 33-35 depend from claim 15 and should be patentable for at least the same reasons as claim 15.

With regard to independent claim 28, when the claim language is properly interpreted the Roth reference does not disclose or suggest the limitations “wherein on at least one side of the wheel when the landing gear is in a position ready for landing of the aircraft, the surface of the wheel/tire assembly presented to the airflow across the part bounded by the widest part of the tire is substantially flat” as recited. Instead the presence of frusto-conical shape 28 and central opening 29 make this impossible.

Accordingly, claim 28 should be patentable because all of the limitations of claim 28 have not been demonstrated to be present in the prior art Hartel, Labrecque or Roth references and the Office Action does not establish a prima facie case of obviousness.

viii. Dependent claims

Claim 18

According to claim 18 which depends from claim 15, the separate part is defined by a multiplicity of flexible elements each extending radially across the junction between the tire and the rim. The Final Office Action does not address these limitations of claim 18. None of Hartel, Labrecque and Roth disclose or suggest these limitations. As admitted by the Examiner, Hartel and Labrecque disclose no structures at the junction between the tire and the rim. Roth discloses only an “annular rubber lip 36” which is not formed of “a multiplicity of flexible elements” as recited in claim 18. Accordingly, these limitations are not disclosed or suggested by the cited prior art and no prima facie case of anticipation or obviousness has been established with regard to claim 18. Thus, claim 18 should be patentable for at least this reason. Appellant respectfully requests that the board reverse the rejection.

Withdrawn claims 19, 21-22, 24 and 31-32

Withdrawn claims 19, 21-22, 24 and 31-32 depend directly or indirectly from claim 15 and should be patentable for at least the same reasons as claim 15. Accordingly, if claim 15 allowed, withdrawn claims 19, 21-22, 24 and 31-32 should be rejoined and allowed as well.

8. SUMMARY

For the reasons discussed above, claims 15-18, 20, 23, 27-29 and 33-35 are not properly rejected as being unpatentable over Hartel in view of Roth and over Labrecque in view of Roth.

It is respectfully submitted that the art cited does not render the claims obvious and that the claims are patentable over the cited art. Reversal of the rejection and allowance of the pending claims are respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Paul C. Onderick", with a stylized, flowing script.

Paul C. Onderick  
Registration No. 45354

Customer No. 24113  
Patterson Thuent Christensen Pedersen, P.A.  
4800 IDS Center  
80 South 8th Street  
Minneapolis, MN 55402  
Telephone: 612.349.5766

*Please grant any extension of time necessary for entry; charge any fee due to Deposit Account No. 16-0631.*

CLAIMS APPENDIX

The Claims on Appeal

15. (Previously Presented) An aircraft comprising a landing gear moveable between a stowed position and a deployed position, the landing gear including a wheel/tire assembly, said wheel/tire assembly including a wheel having a rim around which there is mounted a tire, wherein

(a) the tire and the rim are each so shaped that a gap is defined between a surface of the rim and a surface of the tire,

(b) a separate part is provided at the junction between the tire and the rim, and

(c) said separate part has

(i) a first surface that abuts the tire,

(ii) a second surface in contact with the rim, and

(iii) a third surface

which extends between the first surface and the second surface so as to provide a surface to smooth and close the gap in the region of the junction between the tire and the wheel rim,

whereby on at least one side of the wheel, during use of the landing gear on an aircraft when airborne and the landing gear is in a position ready for landing of the aircraft, the third surface of said separate part acts to reduce the noise that would result in the absence of the separate part from the interaction of the gap and the airflow during approach of the aircraft on landing and wherein

(d) on at least one side of the wheel during use of the aircraft when airborne and the landing gear is in a position ready for landing of the aircraft, the surface of the wheel/tire assembly presented to the airflow across the part bounded by the widest part of the tire is substantially flat.

16. (Previously Presented) An aircraft according to claim 15, wherein at least a portion of said separate part is flexible and so arranged that it may be moved manually to reveal a portion of the tire that is otherwise hidden from view.

17. (Previously Presented) An aircraft according to claim 15, wherein said separate part is defined at least partly by an elastically deformable material.

18. (Previously Presented) An aircraft according to claim 15, wherein said separate part is defined by a multiplicity of flexible elements each extending radially across the junction between the tire and the rim.

19. (Withdrawn) An aircraft according to claim 15, wherein said region is defined by brushes, which bridge a gap between the wheel rim and the tire.

20. (Previously Presented) An aircraft according to claim 15, wherein at least a portion of said separate part is so configured that, once the force between the wheels and the ground exceeds a first given threshold force, it moves out of a gap that said separate part bridges when the aircraft is airborne, and once the force between the wheels and the ground drops to or below a second given threshold force, it moves back to the position in which it bridges the gap.

21. (Withdrawn) An aircraft according to claim 15, wherein said region is defined by a sealing element, which bridges a gap between the wheel rim and the tire.

22. (Withdrawn) An aircraft according to claim 21, wherein the sealing element is formed from liquid sealant material that has been solidified.

23. (Previously Presented) An aircraft according to claim 15, wherein the separate part is disposed on both sides of the wheel such that, during use of the landing gear on an aircraft when airborne and the landing gear is in a position ready for landing of the aircraft, the surface of each separate part interfaces smoothly with a surface, presented to the airflow, of the tire and a surface, presented to the airflow, of the wheel.

24. (Withdrawn) An aircraft according to claim 15, wherein said region is defined by a separate component part of the wheel.

25. (Withdrawn) An aircraft according to claim 15, wherein, on at least one side of the wheel during use of the aircraft when airborne and the landing gear is in a position ready for landing of the aircraft, the surface of the wheel/tire assembly presented to the airflow within the region bounded by the widest part of the tire is substantially smooth in shape.

26. (Withdrawn) An aircraft according to claim 25, wherein said surface of the wheel/tire assembly is substantially planar.

27. (Previously Presented) An aircraft according to claim 15, wherein the aircraft is of a size suitable for carrying more than 50 passengers.

28. (Previously Presented) A retractable aircraft landing gear including a wheel/tire assembly, said wheel/tire assembly including a wheel having a rim around which there is mounted a tire, wherein the wheel further includes at least one part that smoothly envelopes the junction between the tire and the rim, said at least one part being shaped such that on at least one side of the wheel, during use of the landing gear on an aircraft when airborne and the landing gear is in a position ready for landing of the aircraft, a surface exposed to the airflow of said at least one part interfaces smoothly between a surface, exposed to the airflow, of the tire and a surface, exposed to the airflow, of the wheel so that in use the flow of air past said at least one part is streamlined and wherein on at least one side of the wheel when the landing gear is in a position ready for landing of the aircraft, the surface of the wheel/tire assembly presented to the airflow across the part bounded by the widest part of the tire is substantially flat.



29. (Previously Presented) A method of reducing noise caused by an aircraft during approach of the aircraft on landing including a step of modifying an existing design of an aircraft in order to reduce noise caused by the landing gear of the aircraft, and a step of manufacturing an aircraft according to claim 15.

31. (Withdrawn) A component for use as said separate component of an aircraft according to claim 24.

32. (Withdrawn) An annular sealing element, said sealing element including a first side and a second side, wherein the first side includes a gap filler structure to close a gap between a tire and a wheel rim and the second side is planar so that it interfaces smoothly with the tire and the wheel to form a streamlined surface.

33. (Previously Presented) An aircraft according to claim 15, wherein the first surface follows the shape of the tire.

34. (Previously Presented) An aircraft according to claim 15, wherein the second surface follows the shape of rim.

35. (Previously Presented) An aircraft according to claim 15, wherein the surface of the wheel/tire assembly presented to the airflow, within the part bounded by the widest part of the tire is substantially planar.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.